Entertainment

Home Entertainment Gateway MCF547x ColdFire® Microprocessor Application

Overview

A home entertainment gateway is a communication and storage hub in the home that functions as a secure audio, video, and file server; wireless router and firewall; and a personal video recorder.

Key Benefits

> Enables a wide range of home entertainment gateway products that can be developed based on the same core design using the different PCI peripherals on the MCF547x devices

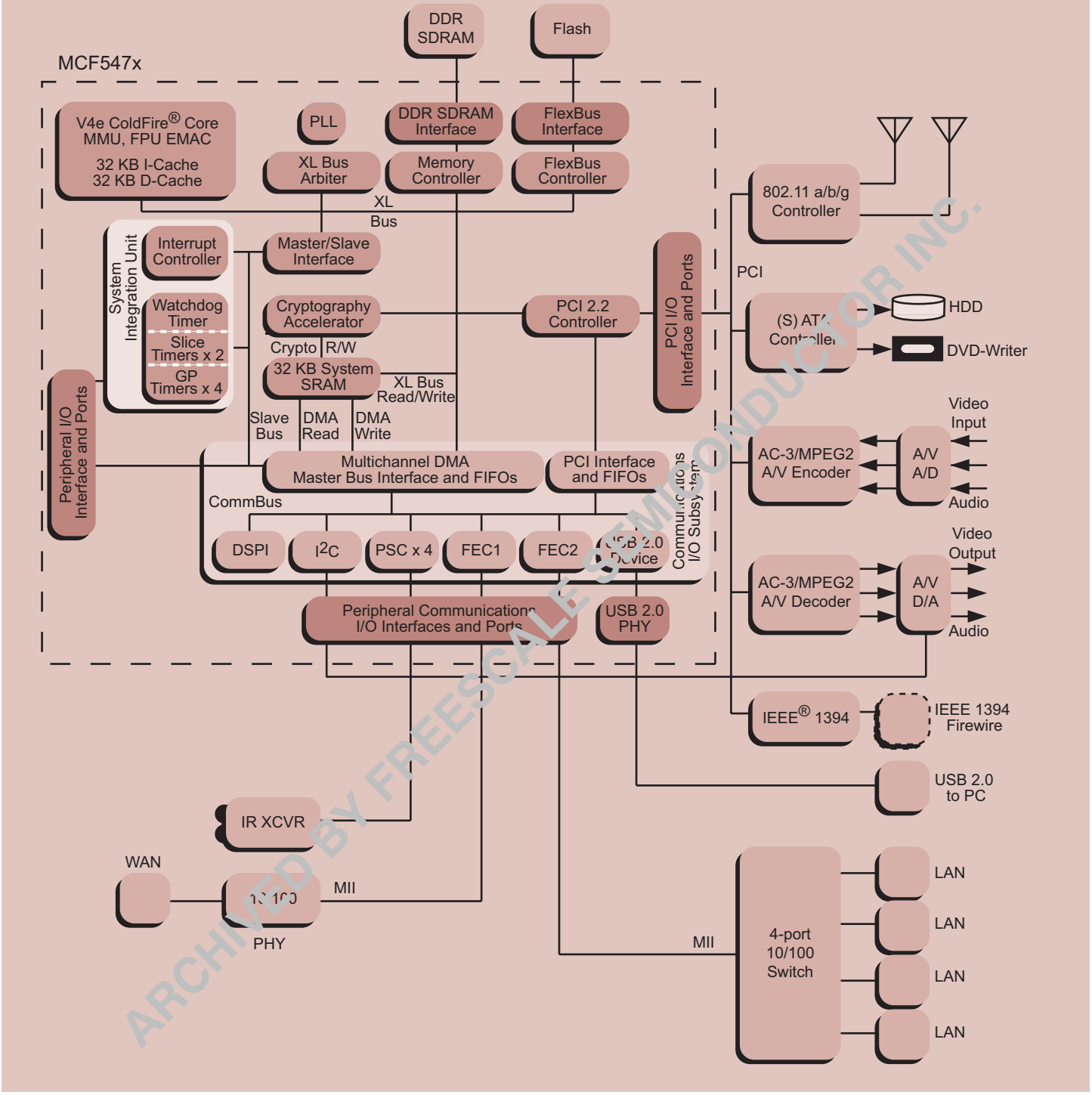
> Delivers high data throughput for communications-intensive peripherals included in a gateway application provided by the device's system architecture on the MCF547x

> Helps to ensure secure transmission of data through the gateway with the hardware-accelerated encryption on the MCF547x devices

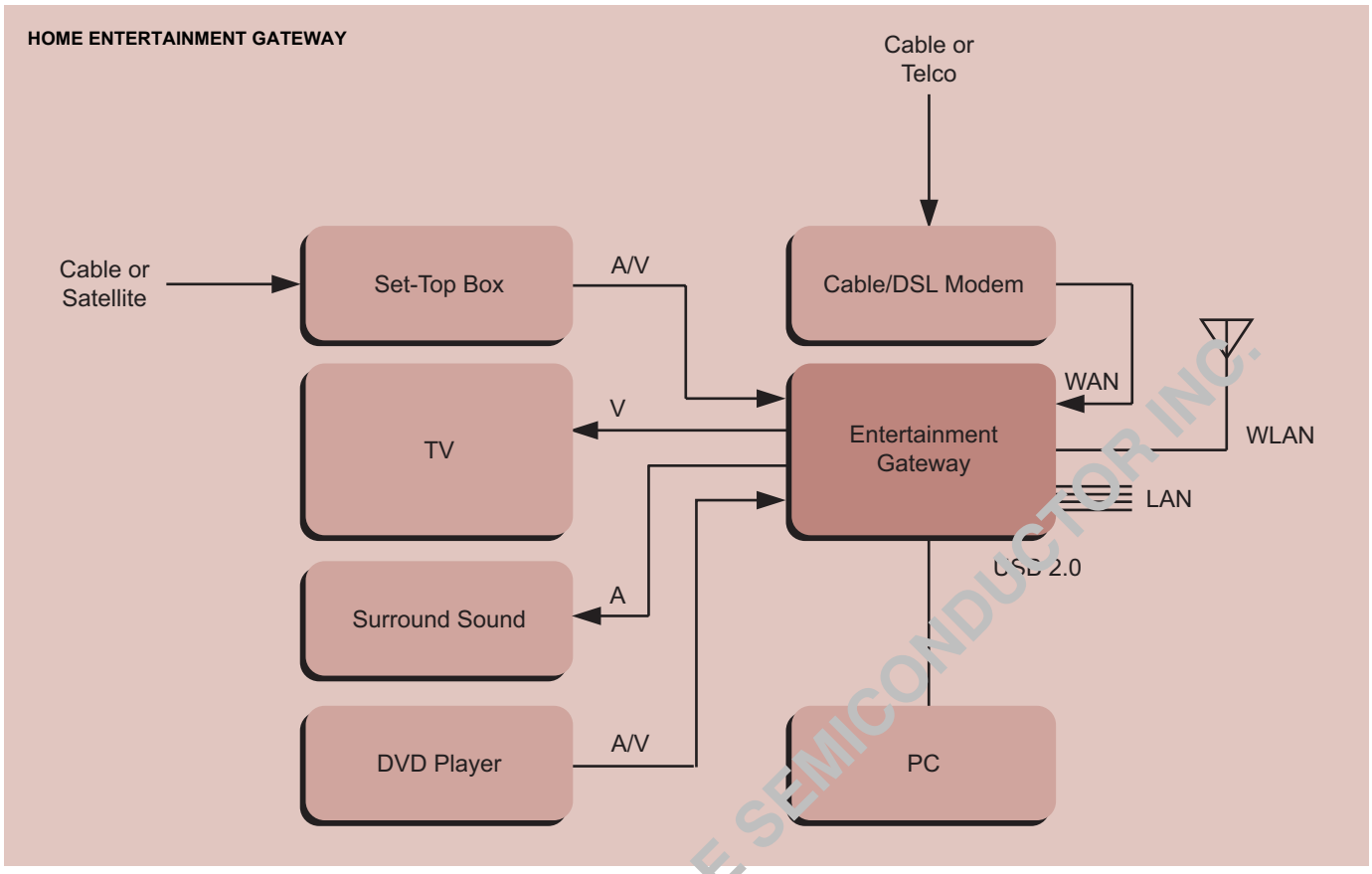
ARCHIVED BY FREESCALE SEMICONDUCTOR INC

Launched by Motorola
freescale™
semiconductor

MCF547X COLDFIRE MICROPROCESSOR BLOCK DIAGRAM



ARCHIVED BY FREESCALE SEMICONDUCTOR INC.



ARCHIVED BY FREESCALE SEMICONDUCTOR INC.

Freescale Ordering Information

Part Number	Product Highlights	Additional Information
MCF5475ZP266	Two 10/100 Ethernet Controllers, USB 2.0 Device with Integrated PHY, v2.2 PCI Controller, DDR Memory Controller, Encryption Accelerator	266 MHz
MCF5475ZP200	Two 10/100 Ethernet Controllers, USB 2.0 Device with Integrated PHY, v2.2 PCI Controller, DDR Memory Controller, Encryption Accelerator	200 MHz
MCF5474ZP266	Two 10/100 Ethernet Controllers, USB 2.0 Device with Integrated PHY, v2.2 PCI Controller, DDR Memory Controller	266 MHz
MCF5474ZP200	Two 10/100 Ethernet Controllers, USB 2.0 Device with Integrated PHY, v2.2 PCI Controller, DDR Memory Controller	200 MHz
MCF5473ZP200	One 10/100 Ethernet Controller, USB 2.0 Device with Integrated PHY, v2.2 PCI Controller, DDR Memory Controller, Encryption Accelerator	200 MHz
MCF5472ZP200	One 10/100 Ethernet Controller, USB 2.0 Device with Integrated PHY, v2.2 PCI Controller, DDR Memory Controller	200 MHz
MCF5471ZP200	Two 10/100 Ethernet Controllers, v2.2 PCI Controller, DDR Memory Controller, Encryption Accelerator	200 MHz
MCF5470ZP200	Two 10/100 Ethernet Controllers, v2.2 PCI Controller, DDR Memory Controller	200 MHz

Design Challenges

The key requirements of a microprocessor for the home entertainment gateway application are connectivity and price/performance. Processors for this application require dual Fast Ethernet interfaces for routing; a USB 2.0 device controller; and a PCI bridge to interface to the IEEE 802.11a/b/g radios, (serial) ATA storage controller, MPEG2/AC3 video/audio processor and optional IEEE 1394 controller. In addition, they require an I^2C bus for controlling the video components and an infrared-capable serial port for IR remote control. The processor must have sufficient performance and memory bandwidth to handle simultaneous A/V recording and playback, routing, and file serving. A crypto engine is also required in order to accelerate encryption for the wireless link and to encrypt files stored on the hard disk.

Because the home entertainment gateway application is an embedded, always-on device that requires a reliable RTOS or Linux® operating system, full memory management capability is an asset.

Freescale Semiconductor Solution

The MCF547x Family provides the essential connectivity requirements for a home entertainment gateway. It features a V4e ColdFire® core with large dual 32 KB caches that deliver 410 MIPS (Dhrystone 2.1) of performance at 266 MHz. The Memory Management Unit (MMU) allows a full protected-mode OS, such as standard Linux OS, to be used.

The 32-bit wide DDR SDRAM controller provides high-memory bandwidth for A/V, storage, and network data. The on-chip 32 KB SRAM can be used to store critical routines and data, in addition to keys and initialization vectors for the on-chip crypto engine.

The serial peripherals (dual Fast Ethernets, USB 2.0 device, I^2C and four programmable serial ports) are supported by DMA channels to minimize CPU overhead. The integrated PCI bridge supports bus mastering for direct transfers to and from memory.

With the required key functionalities integrated into the MCF547x Family, a range of home entertainment gateway products can be developed based on the same core design, but with different PCI peripherals and software.

Development Tools

Product Name	Vendor	Additional Information
CodeWarrior™ IDE CodeWarrior Compiler: C/C++ CodeWarrior Source Level Debugger RTOS: Packaged with ARC MQX Hardware Debug Connection CodeWarrior Cycle Accurate Instruction Set Simulator Platform Creation Suite for Linux® OS CodeWarrior Development Studio, ColdFire Edition for Linux	Metrowerks Corp.	www.metrowerks.com
Evaluation Board: Zoom ColdFire Development Kit ColdFire Card Engines Zoom Display Kits: QVGA, VGA and SVGA	Logic Product Development	www.logicpd.com
IDE: Multi Compiler: C/C++/EC++ RTOS: ThreadX® and INTEGRITY® Instruction-Set Simulator Source Level Debugger Hardware Debug Connection	Green Hills Software, Inc.	www.ghs.com
IDE Compiler: C/C++ Hardware Debugger: visionICE II Source Level Debugger: vision CLICK	Wind River Systems, Inc.	www.windriver.com
Network Development Kit IDE RTOS TCP/IP Stack, Web Server Compilers: C/C++ Source Level Debugger Hardware Reference Design IEEE® 802.11b Solution	NetBurner	www.netburner.com
RTOS: MQX TCP/IP Stack: RTCS Internet Security: IPShield with IPsec and SSL Connectivity: USB and CAN Development Kits	ARC International	www.arc.com/ColdFire
RTOS: RTXC™ Quadros TCP/IP Stack: RTXCnet™ Quadros	Quadros Systems, Inc.	www.quadros.com
RTOS: ChronOS™ TCP/IP Stack: NicheStack with integrated IPsec support	InterNiche Technologies	www.iniche.com
Nucleus® RTOS XRAY® Debugger Microtec® Compiler IDE	Accelerated Technology	www.acceleratedtechnology.com
Debugger: GDB Compiler: GCC	GNU	www.gnu.org

ARCHIVED BY FREESCALE SEMICONDUCTOR INC.

Related Documentation

Document Number	Description
MCF5475EC	MCF547x Integrated Microprocessor Hardware Specifications
V4ECFUM	ColdFire CF4e Core User's Manual
MCF5475RM	MCF547x Preliminary Reference Manual
CFPRODFACT	The ColdFire Family of 32-bit Microprocessors Overview and Technology Roadmap
MCFXXXWP	White Paper: Freescale Semiconductor ColdFire VL RISC Processors
CFPRM	ColdFire Family Programmer's Reference Manual
MCF5485EC	MCF548x Integrated Microprocessor Hardware Specifications
MCF5485RM	MCF548x Preliminary Reference Manual

ARCHIVED BY FREESCALE SEMICONDUCTOR INC.

NOTES

ARCHIVED BY FREESCALE SEMICONDUCTOR INC.

Learn More: Contact the Technical Information Center at +1-800-521-6247 or +1-480-768-2130.
For more information about Freescale products, please visit **www.freescale.com**.

Freescale™ and the Freescale logo are trademarks of Freescale Semiconductor, Inc.
All other product or service names are the property of their respective owners.
© Freescale Semiconductor, Inc. 2004. All rights reserved.

SG2062
REV 1
12/2004

December2004

Launched by Motorola
freescale™
semiconductor